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ABSTRACT

This guide for educational practitioners who are considering the purchase of a microcomputer provides a brief discussion of basic information about computers, some criteria to use in conducting a needs assessment prior to the purchase of any microcomputer equipment, and criteria for use in the evaluation of various microcomputers in relation to the needs of the purchaser. Both a needs assessment instrument and evaluation worksheets are included, as well as a glossary of computer terms: a list of microcomputer related organizations, associations, consortia, and networks: a list of relevant periodicals: and a 13-item bibliography. (LLS)

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MICROCOMPUTER REFERENCE

REFERENCE MICROCOMPUTER

SHIRLEY DOUGLAS
GARY NEIGHTS

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To be computer literate a person must first know that a computer is--a tool invented by man, programmed by man, controlled by man, and unable to be anything without being given instructions by man to be that thing.

- Betty Burr

Computers are coming into their own in the educational field. With the advent of the microcomputer, it is feasible for a district to purchase one or more within the school budget. Microcomputers provide a means of creative work in music and art, a classroom management tool, test scoring, general administrative needs, individualized curriculum, and computer operation and programming.

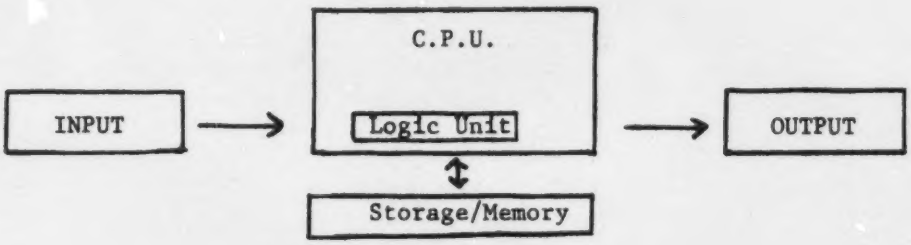
In a recent DELPHI forecast a group of computer scientists predicted the following:

> By 1980 the small business computer is expected to be used in twice as many businesses as in 1976.
>
> By 1992 all factual information will be on computer files and libraries will exist only for literature.
>
> By 2000 all major industries will be controlled by computers.
>
> By 2000 computers will be as common in private homes as televisions and telephones.

This pamphlet is to be a guide for those considering the purchase of a microcomputer. It will discuss how to develop criteria to purchase a microcomputer, avenues to pursue to determine criteria, and a brief discussion of computer basics.

BACKGROUND

A computer is composed of four basic parts: the input unit, memory unit, central processing unit and output unit. The Central Processing Unit (CPU) is considered the "Brain" that manipulates all information and performs all operations. All other components of the microcomputer have interaction with the C.P.U.



INPUT is often in the design of a keyboard resembling a typewriter. Input is the way information is put from the outside to the inside of a computer for the purpose of processing. Inputs may also be in the form of cassette, floppy disk, magnetic card, CRT (Cathode Ray Tube), printer, or paper tape reader.

OUTPUT is often the same as the input mode. This is where processed information, and results of calculations go out. Outputs come frequently as CRT terminal, printer, magnetic tape, cassette, plotter, disk or other peripherals. Outputs can go through a telephone or cable line.

MEMORY is where information is stored. It can be found in two forms. It is found in terms of RAM or ROM. RAM is Random Access Memory which allows the CPU to store and gather data rapidly, i.e., 16K- 16,000 characters or storage. RAM can be erased and reprogrammed by the operator as frequently as necessary.

Another memory is ROM - Read Only Memory. ROM is an integrated circuit on which data or instructions are programmed at the time of manufacture inside the CPU. It cannot be earned or reprogrammed by normal computer operations. All memory is stated in terms of bytes such as 8K equals 8,000 characters or bytes or information.

CPU The CPU conducts all information in and out of the other three parts of the computer. The electronic impulses from the other computer segments are sent to their necessary units by the CPU. The arithmetical logic performs all the arithmetical and logical operations. Such operations as addition, subtraction, multiplication, division and comparing are carried out in the logic area. The CPU also takes care of such things as sorting and rearranging information such as alphabetizing.

MICROCOMPUTER SYSTEM

A microcomputer system is simply a means to accomplish a job. Let's take a typical system to examine its component parts determining what each part does.

The video display allows you to hold a conversation with the system. The microcomputer talks to you by displaying appropriate messages on a video screen. You respond by typing a reply at a keyboard. Anything you type in is displayed on the screen to reassure you that you made no mistakes and that the microcomputer accepted your input information. There is very little difference between the video display and your home television set. Usually a video display has better resolution--you have smaller characters displayed on the screen without being fuzzy or too small to read. A video display is frequently referred to as a Cathode Ray Tube (CRT) or a video display unit (VDU). CRT refers to the way in which television and video display tubes are currently built. Cathode ray tubes are used to create images.

Keyboards are presently used in microcomputers to input new information. It's possible to replace a keyboard with a typewriter providing it has an "interface." Standing a typewriter next to the microcomputer and television set and hitting the keys will have no effect on the television. Someone must build into the typewriter the electronics to sense depressed keys and create appropriate signals causing the microcomputer to realize that a key has been depressed and to tell the CRT to show that a key has been depressed. This is an interface. Every part of the system must be interfaced to the microcomputer.

A printer is often linked the microcomputer system. It, too, is similar to a typewriter. If it were possible to substitute a typewriter for a printer, it would have its disadvantages.

Primarily the typewriter is too slow. Most printers type at least twice as fast as a typewriter. A fast printer can type 600 lines a minute. A printer is a separate device of the microcomputer system. It permits one to depress a single key and information stored will be printed on paper.

Commanding what a microcomputer must do is programming. Every computer program is a sequence of numbers. A number inside the microcomputer may be simply a step in a program or data, data being the numbers describing the letters and numbers of the alphabet as opposed to being the number sequence of a program step. Numbers are the entire world inside a microcomputer. A small program or task may use thousands of numbers. A problem has then been established because the system has a limited area to store this information. One program may take 80 percent of all the memory space within a microcomputer. Therefore, it is necessary to store programs. Currently floppy disk and cassette are the most popular modes of memory storage. This allows the computer to be used for more than one program.

A cassette storage unit is a cassette recorder and cassettes. Cassettes store information the same as your standard cassette recorder. The cassette recorder like all other peripherals (any accessory such as a printer, cassette recorder, etc.) must be interfaced to the system. Today most cassette storage of information is stored as beeps of sounds. Cassette information is sequential. Thus if you wished the 90th item of information the first 89 items must be read. It may take 15 minutes to reach the last bit of information making cassette storage slower than the floppy disk. Changing information records is difficult with cassette storage.

Floppy disks on the other hand are random access. It means you can access any information located on the disk without reading the information before it. This allows fast retrieval of information. The disk itself has a smooth magnetic surface. The information is stored in tracks through magnetic pulses. Generally the disk has more storage capacity and accesses the material much faster. At the beginning of each disk a catalog or file must be developed to identify the material and where it is located.

CRITERIA

The challenge to you as educators in selecting a microcomputer is to find a system that will not only fill your immediate needs but to fill those applications you cannot yet foresee.

Visit someone who owns a microcomputer to get a feel for a microcomputer. This will also provide conversation as to advantages and disadvantages. Become familiar with the available literature being published.

A top priority is to assess your educational goals and needs before purchasing a microcomputer. In the assessment period it's equally important to assess the willingness on the part of administrators and teachers to invest personal effort, personnel and commitment to a microcomputer's use. That commitment involves more than planning, implementing and evaluation of the computer's usage. To make the microcomputer a vitally important teaching tool, funding considerations should be twofold. Initial funds for the hardware are a first priority. Secondary, but just as important, are funds for courseware (software), repair and maintenance. To make a partial commitment for one area without the other will probably guarantee failure.

Developing purchase criteria is of great importance in an age when budget dollars have to be stretched in many different directions. Curriculum needs should be assessed to determine the curriculum priorities. Using these needs assessments, it is then time to locate the materials, equipment and modes of teaching to accomplish these needs. Assuming that there are such needs, it is now necessary to analyze how the microcomputer and its potential application can fulfill those needs.

How a microcomputer will be utilized within a school structure needs to be evaluated to better determine which microcomputer system to purchase. Once projected uses are determined, it will be easier to choose the right microcomputer to fit your needs. The following pages are guides to determine a projected need or needs.

PROJECTED USES

I. Initially determine curriculum areas of use and possible other uses.

Subject Areas	Other Uses
_____ math	_____ guidance
_____ science	_____ library science
_____ social studies	_____ media
_____ health	_____ management
_____ industrial arts	_____ computer literacy
_____ home economics	_____ other _____
_____ reading	_____
_____ language arts	
_____ foreign language	
_____ business education	
_____ physical education	
_____ other _____	

II. If the microcomputer is to be used as an instructional tool (i.e.: math, art, music, etc.) the next step is to determine the microcomputer's utilization by the classroom teacher and the student.

Classroom Teacher Application	Student Application
_____ curriculum (subject area teaching)	_____ discovery learning
_____ computer operation and programming	_____ problem resolution
_____ computer literacy instruction	_____ graphics development
_____ testing	_____ musical exploration
_____ classroom management (teacher's record keeping)	_____ computer programming
_____ other _____	_____ computer awareness
	_____ counseling and guidance
	_____ other _____

III. If the microcomputer is to be used beyond that of an instructional tool, the following applications should be considered.

Media

_____ program development

_____ inventory

_____ utilization and maintenance records

_____ budget

_____ video

_____ circulation control

_____ graphics generation

_____ other _____

Library

_____ instruction

_____ book location

_____ card file

_____ inventory

_____ budget

_____ circulation control

_____ other _____

Management

_____ attendance

_____ letter file

_____ class registration

_____ student scheduling

_____ bus routing

_____ fiscal and budget control

_____ inventory control

_____ other _____

Support Services

_____ word processing

_____ teacher assignment

_____ student assignment

_____ other _____

_____

Guidance

_____ student tracking

_____ occupation selection

_____ college selection

_____ confidential student files

_____ other _____

Buildings and Grounds

_____ security

_____ maintenance schedules

_____ inventory

_____ other _____

IV. From the varied uses indicated, more than one microcomputer system may be necessary. The potential locations of these systems will be an additional factor to consider and thus determine the quantity of microcomputers necessary to meet the potential needs.

LOCATION:

Classroom

_____ a. permanent location

_____ b. shared (mobile between classrooms)

c. estimate number needed:

_____ permanent

_____ shared

Other

_____ school office

_____ library

_____ TV studio

_____ media office

_____ business office

_____ administration building

_____ guidance office

_____ other _____

_____

Let's take a look at several microcomputers and evaluate them in relation to your needs. The comment and tally sheets will be used for comparison and evaluation. Sample tally and comment sheets are found on pages 9, 10, and 12. Comment, tally and projected use worksheets are in back of the booklet. Each evaluation will be different as the needs of programs vary. One area will be rated differently, higher or lower, according to individual program needs. Assign an importance factor to each area from cost to servicing (1-10 works well). The importance factor reflects one's needs. If the most important concern of the microcomputer is color reproduction and graphics they would be assigned factors of 10. Loading speed on the other hand, may be of very little importance, it is assigned a 2. The IMPORTANCE FACTORS will be very important later.

TALLY SHEET

CATEGORY	IMPORTANCE FACTORS	SCALE RANKING	RATING
1. COST--TOTAL			
2. FLEXIBILITY			
3. MAINFRAME INTERFACE			
4. KEYBOARD LAYOUT			
5. ADDITIONAL PORTS			
6. EXECUTION TIME & LOADING SPEED	2		
7. MEMORY CAPABILITY			
8. SYSTEM EXPANSION			
9. EDITING			
10. INPUT AND OUTPUT DEVICES			
11. SOFTWARE			
12. GRAPHICS/CHARACTERS	10		
13. COLOR	10		
14. VOICE COMMAND AND VOICE GENERATION			
15. MUSIC GENERATION			
16. SERVICING			
17. USER TRAINING			
18. TOTALS			

When evaluating a microcomputer, use the comment sheet. Write notes about that particular model and brand. To better evaluate the computer, use the criterion questions 1-16 on pages 10 and 11. The notes on the comment sheet will be translated into numbers on the tally sheet.

COMMENT SHEET

CATEGORY	BRAND Spacetron MODEL 007	BRAND MODEL
1. COST--TOTAL	795 - 16K 995 - 32K	
2. FLEXIBILITY	reg. power source no spec. environ controls NASA durability tested	
3. MAINFRAME INTERFACE	none	
4. KEYBOARD LAYOUT	Standard w/ calculator	
5. ADDITIONAL PORTS	5ports uses RAM	
6. EXECUTION TIME & LOADING SPEED	L.S. - 5sec 1.2sec E.T.	
7. MEMORY CAPABILITY		
8. SYSTEM EXPANSION	48K	
9. EDITING	none	
10. INPUT AND OUTPUT DEVICES	printer, plotter, disk,	
11. SOFTWARE	5programs math manuals	
12. GRAPHICS/CHARACTERS	HI RESOLUTION	
13. COLOR	14 color stand. T.V. monitor	
14. VOICE COMMAND AND VOICE GENERATION	NO	
15. MUSIC GENERATION	NO	
16. SERVICING	none	
17. USER TRAINING	none	
18. TOTALS	N/A	

CRITERION QUESTIONS 1-16

1. Cost: This is a factor to be considered. Micros generally range from $500 to $3,000 to establish a system. This cost is to be with all peripherals needed to operate.

2. Flexibility: (Size, portability, cords and modules, environment) Depending upon needs can the unit be readily moved? Is it necesary for the unit to be moved? It is sturdy and reliable to survive moving around? Has it been tested for durability? How much does it weigh? Is it necessary to be near an outlet or telephone lines? Do the learners have to be brought to the unit or does the unit have to be taken to the learners? Can the unit be accessed other than being right at the microcomputer itself? How many cords necessary to operate the micro? Is there a need for special environmental controls, i.e., temperature, humidity, dust? (Protection from exterior electrical interference, i.e., other computers, static charges, another electromagnetic field)

3. Mainframe Interface: Does the unit have the ability to interface with available mainframe computers to function as a smart terminal?

4. Keyboard Layout: Most micros come with a standard typewriter layout. If the unit does not, will it fit your needs? Does it have a calculator layout on it? Is a calculator layout necessary or can the standard typewriter numbers fulfill the calculation needs?

5. Additional Ports: Can other peripheral devices be connected to the unit, i.e., printers. plotters, phone lines, disks, etc.? Are there sufficient ports to substantiate your operational needs? Do these ports use memory (RAM) that would otherwise be available?

6. Execution time and loading speed: How long does it take the microcomputer to execute an operation? How fast can information be loaded into the unit? Is the execution time, problem, operation or loading of a program too long for student attention spans?

7. Memory capability: How much ROM memory is the unit capable of? How much RAM memory can be taped? RAM is found in varying forms. If strictly for running of prepackaged materials then usually 16K will suffice but generally self generated programs will take more bytes of memory (RAM).

8. System Expansion: Can the system be expanded easily? What are the limits of the expansion? What peripherals are available? Are peripherals needed? With the current state of advances new items for purchase are always being developed, such as light pens, graphics, tablets, voice synthesizers, etc. Maybe even keys for the blind or some other new advances are in the making as this pamphlet goes to publication.

9. Editing: Can editing take place immediately as mistakes occur? Is editing simple? After the program is completed can editing be done? Can changes in the program to suit needs be done? Will the unit identify specific program errors?

10. Input and Output Devices: As specified for purchase what input and output devices are included in the package, i.e., cassette, disk, TV monitor, printer, plotter, graphics tablet, light pen, voice synthesizer?

11. Software: Are there sufficient manuals, reference and program material available to support the microcomputer? Are there programs suited to the user's needs? Have outside companies other than the original designer, made additional software programs? Is there enough software available to fulfill needs? Can programs be made to fulfill the user's needs? Have the programs been validated (field tested with students)? Cost of prepared programs? Ease of self-generated programs?

12. Graphics/Characters: Is the unit capable of low or high resolution graphics? How many characters per line are available on the micro? How many lines on the CRT are visible? What is the screen size? Graphics tablet? Light pen?

13. Color: Is color necessary for your operations? If color is necessary, does the CRT monitor have to be a special monitor?

14. Voice command and voice generation: Does the unit have voice synthesizers, to generate voice, does it have or can it be adapted to accept voice commands?

15. Music Generation: Is there music capability? Does it have an internal speaker or separate speaker system for sound?

16. Servicing: What are the warranties available? Can the unit be serviced at its home base? Is on-site servicing necessary? Can local technicians make necessary repairs. For additional cost will the unit be updated for the next year as new developments are made? Length of time for service including transportation to and from service facility? Service cost including transportation?

17. User Training: Will vendor provide on-site user training? At what cost? How many hours? For how many people?

On the tally sheet using a scale ranking (1-5) assign a rank value for each category from the comment sheet. If the cost is high give it a 1. If it is easily movable and compact then flexibility may be a 5. If no service is available category (16) is assigned a 0, etc. When all categories have been assigned a scale ranking, multiply them by the importance factor you originally assigned. The end results are added together. The highest total (18) will indicate the microcomputer best suited for your uses and needs. Be as sincere as possible to get an unbiased evaluation. Color of the case, unnecessary extras or the salespersons personality should not affect the choice.

TALLY SHEET

CATEGORY	IMPORTANCE FACTORS	BRAND SPACETRON SCALE RANKING	RATING
1. COST--TOTAL	5	1	5
2. FLEXIBILITY	5	5	25
3. MAINFRAME INTERFACE	10	0	0
4. KEYBOARD LAYOUT	3	5	15
5. ADDITIONAL PORTS	10	4	40
6. EXECUTION TIME & LOADING SPEED	10	3	30
7. MEMORY CAPABILITY	10	2	20
8. SYSTEM EXPANSION	8	5	40
9. EDITING	10	0	0
10. INPUT AND OUTPUT DEVICES	9	3	27
11. SOFTWARE	10	2	20
12. GRAPHICS/CHARACTERS	8	5	40
13. COLOR	5	5	25
14. VOICE COMMAND AND VOICE GENERATION	5	0	0
15. MUSIC GENERATION	3	0	0
16. SERVICING	10	0	0
17. USER TRAINING	10	0	0
18. TOTALS	—	—	297

GLOSSARY

ACCESS TIME
The period of time between calling for information from memory and the delivery of that information. A disk storage is generally faster than tape storage.

ADDRESS
Designates where information is stored within a memory device.

ALPHANUMERIC
The computer symbols, letters (A-Z) and/or numerals (0-9), and/or special punctuation, mathematical, or graphic symbols.

ARCHITECTURE
The internal, preset arrangement or organization of a computer that determines how the computer operates.

ASCII
American Standard Code for Information Interchange. A Binary number code for letters, numbers, symbols, etc., accepted as a standard by the industry.

ASSEMBLER
The program that converts English in machine language (binary format).

BASIC
Acronym for Beginners All-Purpose Symbolic Instruction Code. Using common English words and mathematical symbols to perform arithmetic and logical operations in the computer to solve problems.

BAUD
Rate with which one device transfers information in one second. 1500 Baud is equivalent to about 150 characters per second. It is stated as bits per second (bps).

BINARY CODE
A code that uses zeros and ones for data. 10110011 may represent the letter C.

BIT
Binary Digit. The smallest unit of digital information thought of as representing: a yes/no choice or whether a circuit is on or off, stated as a zero or one.

BPS
Bits per second.

BRANCH

An instruction when met in a program makes a move to another part of the program deviating from the normal sequencing of the program. Branch statements are one of two types conditional (statement command IF...THEN) or unconditional statement command (GO TO).

BUG

Error--be it a programming error or equipment malfunction.

BUS

Set of wires that allows data to be sent generally with microcomputers bidirectionally.

BYTE

A group of binary bits. Eight bits is equal to one byte. It takes 8 bits to form one character; so one byte is generally equal to one letter, number, or graphic symbol.

CASSETTE RECORDER

A device through which information is stored. The information is put onto the cassette as audio signals. The cassette information is stored sequentially and therefore a slower format for storage of information.

CHIP

The heart of a microcomputer, on which thousands of electronic elements are implanted. This piece of silicon, a microprocessor, contains all the circuitry to carry out the many computer operations. It is created through a photographic etching process.

CODE

The relationship between bits and a set of characters, alphabet letters, numbers or graphic symbols. Each character has its own bit code (zero or one binary representation). The most commonly used code is ASCII.

CODING

Developing a set of computer instructions.

COMMAND

An instruction given to the computer from an input device.

COMPATIBILITY

There are two types of compatibility: software and hardware. Software compatibility refers to the ability to run programs on a variety of computers. Hardware compatibility means that various components (printers, disks, keyboards, etc.) may be connected directly.

COMPILER

A program that translates machine language into basic (everyday) English and vice versa.

COURSEWARE
A combination of content, instructional design, and the physical programs, software, which causes a computer to complete instructions.

CPU
The Central Processing Unit controls what the computer does. In the arithmetic, control, the logic units computations and function directions are done for the computer. The CPU can be considered the center core of the computer.

CRT
The Cathode Ray Tube is similar to a television screen, the CRT terminal usually is accompanied by a keyboard from which information is entered into the computer.

CURSOR
Usually a blinking indicator on the CRT that shows the user where the next character is to be typed and where it will appear.

DATA
The information given to or received from a computer.

DEBUG
Process of finding, locating, and correcting errors in a program.

DIAGNOSTIC ROUTINE/PROGRAM
A program that will check out the hardware and peripherals for incorrect information and breakdown.

DIGIT
A zero or one in the binary system.

DIRECT MEMORY ACCESS (DMA)
A technique to move data rapidly from the microprocessor to a storage device (i.e. disk).

DISK (DISC)
Magnetic coated material in a 5" or 8" record-like shape on which information and programs are started. The information is stored randomly and therefore faster than cassette storage. Sometimes called diskettes or floppy disks.

DOCUMENT
A written description of a piece of software or hardware. It gives the directions to operate a program or piece of equipment.

DOS
Disk Operating System. A set of programs and instructions that permit interaction between the diskettes and the microcomputer.

DOTMATRIX
A method to generate graphic characters by using dot patterns. A 5" x 7" dot matrix is a common example.

DRIVER
A program that controls the peripheral devices and how they interact with the CPU.

DUMB TERMINAL
A terminal that acts as an input/output device only.

DUMP
Loading what's in memory or part of it in the CPU or into memory.

EDITOR
A program that allows a person to change or modify a program.

ERROR
The difference between the actual response of a problem or program and desired response.

EXECUTE
The running of a computer program.

EXTERNAL STORAGE
Peripheral device for storage (i.e. tape or disk.)

FILE
Collection of related data.

FILENAME
Number or letter characters to identify a file, collection of data.

FLOWCHARTING
A programming technique using shaped blocks indicating the direction and sequence of operations in a program.

FORTRAN
Science-oriented program language.

FREQUENCY
Rate at which anything occurs and recurs, measured in cycles or hertz per second.

FULL DUPLEX
Reception and transmission of information at the same time.

GIGO
Garbage in, garbage out. If incorrect information is put into the computer, the output will be misinformation.

GRAPHICS
Characters used to create figures, shapes, and forms on the CRT or printer.

HARDCOPY
Data or information printed on paper distinguished from printed information or a temporary image on the computer's screen.

HARDWARE
The physical equipment that goes into a computer system, consisting of the central processing unit plus all peripherals.

HEAD
On a cassette recorder it is the area that reads information from a pre-made cassette tape.

IC
Integrated Circuit. A plastic or ceramic body with numerous leads extending from it. The silicon body protects the chip. The leads permit electrical connection of the chip to other components. The word "chip" may also be called a microprocessor.

INPUT
Information going to and from a computer or peripheral. The same data may be output as well as input depending upon what part of the computer to which it is going or coming.

INSTRUCTION
A group of bits, command, that will make the computer perform a specific operation.

INTERACTIVE
All personal computer systems are interactive, allowing for two-way communication while it is being used.

INTERFACE
Electronic circuit that connects the CPU and a peripheral device, disk drive, etc., permitting the flow of data back and forth.

INTERNAL STORAGE
Memory system inside of the computer, rather than disk or tape storage.

INTERPRETER
A program used to translate various computer languages.

I/O
Input and output of data and information of a computer system; examples are: keyboard, floppy disk drive, printer, cassette recorder, modems, graphics tablets.

KEYBOARD

Similar to a typewriter keyboard, this is where information is put into the computer. Computer function keys are here such as reset, run, clear, esc, etc.

K/KILO

Equals 1000--With the microcomputer it is speaking of the RAM or ROM memory capability, i.e., 16K is 16,000 bytes of information.

LANGUAGE

A format that allows a programmer to communicate more efficiently with a computer where commands will give requested actions. BASIC being one of the most popular languages.

LOAD

Putting information into the computer's memory.

MACHINE LANGUAGE

A computer programming language that has its instructions in binary, octal or hevadecimal format.

MAIN MEMORY

That memory which is directly accessible to the computer. In a microcomputer, main memory is referred to as RAM or ROM.

MEMORY

The integrated circuits of a computer which stores information and is known in forms as RAM and ROM.

MEMORY CHIP

A chip on which data is stored as electrical charges.

MICROCOMPUTER

Usually included in a microcomputer is the microprocessing unit, keyboard for entering data, and a cassette recorder or disk for storing programs, and a monitor. A hardware configuration usually acquired in one of three ways: constructing several components from individual electronic parts; connecting several already-constructed components; or by purchasing a unit with built-in components. The microcomputer records information, processes it, puts it into meaningful terms, communicates it, stores it, and retrieves it.

MICROPROCESSOR

An integrated circuit that executes instruction inside the microcomputer.

MODEM

A device that makes computer information transfer over phone lines possible. It changes the tones to signals understood by the computer.

MODULATOR
A device called an RF modulator to permit a standard television to act as a video display unit.

MONITOR
A video display unit which uses a cathode ray tube to generate characters with high lines of resolution, permitting very small characters to be projected on the screen.

MOTHERBOARD
The central board or boards inside the microcomputer interconnects the various chips, and allows the interface between memory and peripheral devices.

NOISE
Inaccurate data transmission.

NONVOLATILE MEMORY
Memory that holds data even after the power has been shut off. ROM is nonvolatile.

OUTPUT
Information coming from the microcomputer to a display unit, i.e., video display unit, printer.

PERIPHERAL DEVICE
A device, such as a printer, disk drive, etc., which are additional components to the microcomputer.

PERSONAL COMPUTER
A microcomputer designed for instructional uses, entertainment, or personal recordkeeping.

PLOTTER
A device that draws on paper two dimensional shapes and designs.

PORT
The connection spot on the microcomputer where input and output devices can be connected. The most common part is an RS232 plug.

PRINTER
A peripheral device that collects output data from the microcomputer and prints it on paper. Printers are defined as impact or non-impact. Impact printers strike the paper by a ribbon-like a typewriter. Non-impact printers form characters by electrical charges, or spraying ink.

PROGRAM
A series of instructions which causes the computer to do or complete an operation.

RAM

Random Access Memory. Any memory which can be written on or read in which the memory locations can be accessed in random sequence. RAM can be erased and reprogrammed by the programmer as frequently as necessary. RAM size is expressed as a quantity of bytes such as 4K (4,000 bytes). RAM may be expanded by adding memory chips or memory boards.

READ

The act of retrieving from memory or from an input/output device.

REGISTER

A temporary storage device located in the microprocessor which holds computer bits.

RESPONSE TIME

The time interval required for the microprocessor to respond to an instruction or input device.

ROM

Read Only Memory. A circuit where data or instructions are programmed at the time of manufacture. It allows the microcomputer to talk to us in basic. It cannot be erased during normal operations.

RUN

Jargon for execute.

SMART TERMINAL

A terminal that has the ability to process data and function as a computer in addition to being an input/output device for a main frame computer.

SOFTWARE

The programs and documentations to be run on the physical equipment (hardware). The three current formats of software storage are tape (cassette), diskette, and solid state. The microcomputer loads the software into its memory to utilize the software programs.

STORAGE CAPACITY

The quality of bytes a storage unit can hold. A diskette is said to have 48-K (48,000 bytes), has approximately 48,000 characters, letters, numbers, spaces, or symbols.

STORAGE DEVICE

A peripheral device that stores information, i.e., tape or disk.

STORE

Placing information in a storage device.

TAPE

The most common microcomputer tape is magnetic, such as cassette tape. Magnetic tape is stored in electrical charge patterns that are equivalent to what we know as letters, numbers, symbols, etc.

TERMINAL

A peripheral device which allows human communication with a computer. When it is called a terminal, it is frequently tied to a main frame computer.

TRACK

Where electrical charges or characters are stored on diskettes. Some diskettes have up to 70 or more tracks on one diskette.

VIDEO DISPLAY UNIT (VDU)

A part of a microcomputer similar to that of a television where information is placed on its screen.

VOLATILE MEMORY

The memory device when the electricity is turned off and the information is not retained. RAM memory is volatile.

ORGANIZATIONS, ASSOCIATIONS, CONSORTIA AND NETWORKS

ACM — Association for Computing Machinery
1133 Avenue of the Americas, New York, NY 10036

- ES3 is an ACM subcommittee on elementary and secondary schools.
- SIGCUE - ACM's Special Interest Group for Computer Users in Education publishes the SIGCUE BULLETIN quarterly.

ADCIS — Association for the Development of Computer-Based Instruction
Western Washington State College, Bellingham, WA 98225

AEDS — Association for Educational Data Systems
1201 16th Street, NW, Washington, D.C. 20036

CONDUIT — Jim Johnson and Hal Peters
P. O. Box 338, Iowa City, IA 52240

- CONDUIT is a source of information on instructional materials and instructional applications for computers and current research projects.

ICCE — International Council for Computers in Education
c/o Computing Center
Eastern Oregon State College
La Grande, OR 97850

MEAN — Microcomputer Education Applications Network
Suite 800, 1030 15th Street, NW, Washington, D.C. 20005

MECC — Minnesota Educational Computing Consortium
Publications Department, 2520 Broadway Drive
Lauderdale, MN 55113

- MECC has studied the use of microcomputers for both instruction and administration.

NWREL — The Northwest Regional Educational Laboratory
Computer Technology Program
710 SW Second Avenue, Portland, OR 97204

- MICROSIFT is planning a clearinghouse of microcomputer-related programs and materials for education.

PERIODICALS

Byte Magazine
70 Main Street, Peterborough, NH 03458

Classroom Computer News
P. O. Box 266, Cambridge, MA 02138

Creative Computing
Box 789-M, Morristown, NJ 07960

Computing Teacher
Eastern Oregon State College, La Grande, OR 97850

INFOWORLD (Newspaper)
530 Lytton Avenue, Palo Alto, CA 94301

Interface Age
P. O. Box 1234, Cerritos, CA 90701

Kilobaud
1001001, Inc., 80 Pine Street, Peterborough, NH 03458

Kilobaud Microcomputing
1001001, Inc., 80 Pine Street, Peterborough, NH 03458

Personal Computing
1050 Commonwealth Avenue, Boston, MA 02215

Recreational Computing
Department K5, Box E, Menlo Park, CA 94025

Soft Side
The Software Exchange, Inc., 6 South Street, Milford, NH 03055

THE
Technological Horizons in Education (free to principals)
7 Spruce Street, Acton MA 01720

80 Microcomputing
80 Microcomputing, Subscription Department
P. O. Box 981, Farmingdale, NY 11737

REFERENCE SOURCES

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Barden, William. How to Buy and Use Minicomputers and Microcomputers, Indianapolis, Indiana: Howard W. Sams & Co., Inc., 1977.

Coan, James S. Basic Basic: An Introduction to Computer Programming, Cincinnati, Ohio: Hayden Publishing Co.

Frederick, Franz. Guide to Microcomputers, Washington, D.C.: Association For Educational Communications and Technology, 1980.

Freibergere, Stephen and Paul Chew, Jr. Consumer's Guide to Personal Computing and Microcomputers, Rochelle Park, NJ: Hayden Book Co., Inc.

Mccabe, Dwight (Ed.). PCC's Reference Book of Home Computing, Menlo Park, California: People's Computer Company, 1977.

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Turnbull, J.J. Computers in Language Studies, London: The National Computing Center, 1973.

Walter, Russell. Secret Guide to Computers, Elmwood, Ct: SCELBI Computer Consulting, Inc., 1980.

White, James. Your Home Computer, Menlo Park, California: Dymax, Inc., 1977.

TALLY SHEET

CATEGORY	IMPORTANCE FACTORS	BRAND SCALE RANKING	BRAND RATING	BRAND SCALE RANKING	BRAND RATING
1. COST--TOTAL					
2. FLEXIBILITY					
3. MAINFRAME INTERFACE					
4. KEYBOARD LAYOUT					
5. ADDITIONAL PORTS					
6. EXECUTION TIME & LOADING SPEED					
7. MEMORY CAPABILITY					
8. SYSTEM EXPANSION					
9. EDITING					
10. INPUT AND OUTPUT DEVICES					
11. SOFTWARE					
12. GRAPHICS/CHARACTERS					
13. COLOR					
14. VOICE COMMAND AND VOICE GENERATION					
15. MUSIC GENERATION					
16. SERVICING					
17. USER TRAINING					
18. TOTALS					

COMMENT SHEET

CATEGORY	BRAND	MODEL	BRAND	MODEL	BRAND	MODEL
1. COST--TOTAL						
2. FLEXIBILITY						
3. MAINFRAME INTERFACE						
4. KEYBOARD LAYOUT						
5. ADDITIONAL PORTS						
6. EXECUTION TIME & LOADING SPEED						
7. MEMORY CAPABILITY						
8. SYSTEM EXPANSION						
9. EDITING						
10. INPUT AND OUTPUT DEVICES						
11. SOFTWARE						
12. GRAPHICS/CHARACTERS						
13. COLOR						
14. VOICE COMMAND AND VOICE GENERATION						
15. MUSIC GENERATION						
16. SERVICING						
17. USER TRAINING						
18. TOTALS						

PROJECTED USES

I. Initially determine curriculum areas of use and possible other uses.

Subject Areas	Other Uses
_____ math	_____ guidance
_____ science	_____ library science
_____ social studies	_____ media
_____ health	_____ management
_____ industrial arts	_____ computer literacy
_____ home economics	_____ other _____
_____ reading	_____
_____ language arts	
_____ foreign language	
_____ business education	
_____ physical education	
_____ other _____	

II. If the microcomputer is to be used as an instructional tool (i.e.: math, art, music, etc.) the next step is to determine the microcomputer's utilization by the classroom teacher and the student.

Classroom Teacher Application	Student Application
_____ curriculum (subject area teaching)	_____ discovery learning
_____ computer operation and programming	_____ problem resolution
_____ computer literacy instruction	_____ graphics development
_____ testing	_____ musical exploration
_____ classroom management (teacher's record keeping)	_____ computer programming
_____ other _____	_____ computer awareness
	_____ counseling and guidance
	_____ other _____

III. If the microcomputer is to be used beyond that of an instructional tool, the following applications should be considered.

Media

_____ program development

_____ inventory

_____ utilization and maintenance records

_____ budget

_____ video

_____ circulation control

_____ graphics generation

_____ other _____

Library

_____ instruction

_____ book location

_____ card file

_____ inventory

_____ budget

_____ circulation control

_____ other _____

Management

_____ attendance

_____ letter file

_____ class registration

_____ student scheduling

_____ bus routing

_____ fiscal and budget control

_____ inventory control

_____ other _____

Support Services

_____ word processing

_____ teacher assignment

_____ student assignment

_____ other _____

_____

Guidance

_____ student tracking

_____ occupation selection

_____ college selection

_____ confidential student files

_____ other _____

Buildings and Grounds

_____ security

_____ maintenance schedules

_____ inventory

_____ other _____

IV. From the varied uses indicated, more than one microcomputer system may be necessary. The potential locations of these systems will be an additional factor to consider and thus determine the quantity of microcomputers necessary to meet the potential needs.

LOCATION:

Classroom

_____ a. permanent location

_____ b. shared (mobile between classrooms)

c. estimate number needed:

_____ permanent

_____ shared

Other

_____ school office

_____ library

_____ TV studio

_____ media office

_____ business office

_____ administration building

_____ guidance office

_____ other _____

_____